

(Reaffirmed 2018)

भारतीय मानक

मोटर वाहन हेतु इस्पात नलिकाओं के आयाम

(दूसरा पुनरीक्षण)

Indian Standard

**DIMENSIONS FOR STEEL TUBES
FOR AUTOMOTIVE PURPOSES**

(Second Revision)

ICS 43.020; 77.140.75

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1969 and subsequently revised in 1979. As a result of experience gained since its publication and technological development in the area of rolling of steel strip and tubes, it has been decided to revise this standard incorporating the following changes:

- a) High frequency induction welded (HFIW) steel tubes have been incorporated and tolerance on thickness has been modified.
- b) Table 1 for dimensions of steel tubes for automotive purpose has been modified.
- c) Table for outside diameters of tubes and their tolerance has been modified (*see 3.2.3*).

In the formulation of this standard, due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from ISO 4200 : 1991 'Plain end steel tubes, welded and seamless — General table of dimensions and masses per unit length'.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

DIMENSIONS FOR STEEL TUBES FOR AUTOMOTIVE PURPOSES

(*Second Revision*)

1 SCOPE

1.1 This standard specifies dimensions of Electric Resistance Welded (ERW) or High Frequency Induction Welded (HFIW), Cold Drawn Seamless (CDS), Electric Resistance Welded or High Frequency Induction Welded (CEW) steel tubes used in automotive including scooters and motorcycles.

1.1.1 Outside diameters or thickness for shock absorber tubes are not specified in this standard. Purchasers are, however, recommended to ascertain from the manufacturers the sizes easily available before completing any design work which incorporates these tubes.

1.2 Material specification and designations are covered in IS 3074 : 2013 'Steel tubes for automotive purposes — Specification (*third revision*)'.

2 DIMENSIONS

2.1 The dimensions for steel tubes shall be as specified in Table 1.

2.1.1 Dimensions of tubes in this standard have been given in terms of outside diameter and the thickness of the tubes. Steel tubes for automotive purposes may also be ordered on the basis of inside diameter and thickness or to outside and inside diameters by special agreement between the purchaser and the manufacturer.

2.1.2 Dimensions of steel tubes specified in this standard are based on the usage of steel tubes in automobile industry. Requirement for the supply of steel tubes of special sizes, tolerances and finishes, etc, shall be subject to the agreement between the purchaser and the manufacturer.

3 TOLERANCES

3.1 Tolerance for Cold Drawn Seamless (CDS) and Cold Drawn Electric Resistance Welded or Cold Drawn High Frequency Induction Welded (CEW) Steel Tubes

For cold drawn seamless (CDS) and cold drawn electric resistance welded or high frequency induction welded (CEW) steel tubes the following tolerances shall be permissible.

3.1.1 Tolerances on Thickness

- a) *Tolerances on mean thickness* — No tube shall have a mean thickness that departs from the specified thickness by more than,
- 1) ± 0.08 mm for tubes up to and including 2.0 mm specified thickness;
 - 2) ± 0.1 mm for tubes above 2.0 mm up to and including 5.0 mm specified thickness; and
 - 3) ± 2 percent for tubes over 5.0 mm specified thickness.
- b) *Maximum variation in thickness in any one tube* — At no point in the tube shall the variation in thickness be greater than ± 5 percent of the actual mean thickness of the tube.

3.1.2 Tolerance on Mean Inside Diameter or Outside Diameter (Whichever is Specified)

The applicable tolerance is given below:

<i>Mean Inside or Outside Diameter of Tube</i> mm	<i>Tolerance</i> mm
Up to 50.80	± 0.10
>50.80 - 76.20	± 0.13
>76.20 - 101.60	± 0.18
>101.6 - 114.30	± 0.20

3.1.3 Maximum Variation in Diameter in any One Tube

At no point in the tube shall the variation in outside diameter or inside diameter (whichever is specified) be greater than the value given below:

- a) ± 0.05 mm greater than the tolerance on the mean diameter; or
- b) $\pm [0.13 \text{ mm} + D^3/(1\ 000\ t)^2]$ mm, whichever is greater;

where

D = specified outside diameter of the tube, in mm; and

t = specified thickness of the tube, in mm.

The limitations on extreme outside diameter or inside diameter are based on the specified diameter, that is,

Table 1 Dimension of Steel Tubes for Automotive Purposes
(Clause 2.1)

All dimensions in millimetres.

Outside Diameter	Thickness																												
	0.50 (1)	0.80 (2)	0.80 (3)	0.90 (4)	1.00 (5)	1.20 (6)	1.50 (7)	1.60 (8)	1.80 (9)	2.00 (10)	2.20 (11)	2.30 (12)	2.50 (13)	2.60 (14)	2.80 (15)	2.90 (16)	3.00 (17)	3.20 (18)	3.50 (19)	3.60 (20)	4.00 (21)	4.50 (22)	5.00 (23)	5.40 (24)	5.60 (25)	6.00 (26)	6.30 (27)	7.00 (28)	8.00 (29)
5.00	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.00	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8.00	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10.00	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12.70	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13.50	—	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.88	—	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.46	—	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19.05	—	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22.20	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—
23.42	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—
25.40	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—	—
28.60	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—	—
31.75	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—	—
33.70	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—	—
34.00	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—	—
38.10	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—
41.28	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—
42.70	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—
44.45	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—	—
48.30	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
50.80	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
57.15	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
60.30	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
63.50	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
69.85	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
70.00	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
76.20	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
81.20	—	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
82.50	—	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
88.90	—	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
101.60	—	—	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
108.00	—	—	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—
114.30	—	—	—	—	—	—	—	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	—	—	—	—

NOTE — ‘*’ stand for applicable outside dimension and thickness combination.

at no point in the tube shall the lowest reading of the diameter be less than the specified diameter minus the above tolerance, and the highest reading shall not be more than the specified diameter plus the above tolerance. The mean diameter shall be within the limits of the specified diameter plus and minus the tolerance on the mean diameter.

NOTE — The D^3 formula shall not apply to tubes where the $D : t$ ratio is less than 40 : 1.

3.2 Tolerance for Electric Resistance Welded (ERW) or High Frequency Induction Welded (HFIW) Steel Tubes

For electric resistance welded (ERW) or high frequency induction welded (HFIW) steel tubes, tolerances on dimensions shall be as given below.

3.2.1 Tolerance on Thickness (Excluding Weld)

± 8 percent for tube thickness up to and including 2.0 mm and ± 5 percent for tube thickness > 2.0 mm. The height of the internal fin shall be not greater than 60 percent of the specified wall thickness.

3.2.2 The internal welding bead shall be removed, if so specified by the purchaser.

3.2.3 Tolerance on Mean Outside Diameter

The tolerance on mean outside diameter shall be as follows:

Outside Diameter of Tube		Tolerance
Over	Up to and Including	
mm	mm	mm
—	25.40	± 0.10
25.40	50.80	± 0.13
50.80	63.50	+ 0.18
63.50	76.20	± 0.20
76.20	88.90	± 0.25
88.90	114.30	± 0.30

3.2.4 Maximum Variation in the Tube Diameter in any One Tube

At no point in the tube shall the variation in outside diameter greater than two values shall the variation given below:

- a) ± 0.05 mm greater than the tolerance on the mean diameter; or
- b) $\pm [0.13 \text{ mm} + D^3 / (1\,000t)^2]$ mm, whichever is greater

where

D = specified outside diameter of the tube, in mm; and

t = specified thickness of the tube, in mm.

The limitations on extreme outside diameter or inside

diameter are based on the specified diameter, that is, at no point in the tube shall the lowest reading of the diameter be less than the specified diameter minus the tolerance, and the highest reading shall be not more than the specified diameter plus the tolerance on mean diameter.

NOTES

1 The D^3 formula shall not apply to 'tubes where the $D : t$ ratio is less than 40: 1.

2 'Mean' as used above is defined as half the sum of the maximum and minimum values.

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